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BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XI¹

BY ROBERT CUSHMAN MURPHY

DIOMEDEIDÆ

Thalassarche cauta (Gould)

Many albatrosses belonging to this species were collected during the course of the Whitney Expedition along the east coast of New Zealand, at the Chatham Islands, at Bounty Island, and in the adjacent waters. A study of the entire series, and comparison of the American Museum material with additional examples of the species in the British Museum, the Zoölogical Museum at Tring, the Royal Museum of Science at Stockholm, and other institutions, have led to unexpected conclusions.

In the first place, it appears that at least three races of this albatross, one of them not previously recognized, inhabit the Australasian region. Secondly, two of these three forms evidently become widely dispersed during periods when they are not at the nest, and individuals or groups of each are likely to be found associated at points on the ocean far removed from their respective breeding grounds. Mr. Beck, for instance, shot a typical specimen of *Thalassarche cauta cauta* and an equally typical specimen of *Thalassarche cauta salvini* in lat. 38° S., long. 179° W., one hundred and fifty or more miles east of East Cape, North Island, New Zealand. The nearest known breeding ground to this locality, at the Chatham Islands, is occupied, however, by neither of these subspecies but by a third, which is here described as new.

The circumstances add still further support to my opinion that it is hopeless to undertake taxonomic work with random Tubinares collected at sea. If we had only the pelagic specimens of the Whitney Expedition series we might, indeed, be able to understand *Thalassarche cauta* no better than Loomis (1918, Proc. Calif. Acad. Sci., (4) II, part 2, No. 12, p. 45), who lightly disposed of all the mutant forms by calling them "merely the variations occurring within the bounds of *T. cauta*." For-

¹Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, and 370.

tunately, possession of adequate series from the breeding grounds of two races goes far toward bringing an entirely orderly result out of chaos.

To outline the status of the Australasian forms of *Thalassarche cauta*, we may characterize three races as follows:

1.—A large, white-headed and white-naped subspecies, with a light gray tinge on the cheeks in fresh plumage, and a grayish bill. Breeds on islands in Bass Strait, southeastern Australia, and wanders eastward at least to waters east of the Chatham Islands. *Thalassarche cauta cauta*.

2.—A slightly smaller subspecies (especially in bill and feet), with the head and nape light gray, the pileum distinctly paler; bill grayish. Breeds at Bounty Island, and probably at other subantarctic islands of New Zealand, and wanders eastward across the Pacific to the coast of South America. *Thalassarche cauta salvini*.

3.—A short-winged subspecies, otherwise of about the same size as the last, with a dark gray head and nape, the pileum little if any lighter than the remainder; bill entirely bright yellow. Breeds at Pyramid Islet, Chatham Islands; known only from the immediate vicinity of the nesting ground. *Thalassarche cauta eremita*.

These three types, considered in the same order, are as follows:

***Thalassarche cauta cauta* (Gould)**

Diomedea cauta GOULD, 1840, Proc. Zool. Soc. Lond., p. 177 (Bass Strait).

One male, lat. 38° S., long. 179° W. (east of East Cape, New Zealand), December 2, 1925; one male, lat. 44° S., long. 173° W. (east of the Chatham Islands), January 29, 1926; older specimens in the American Museum collection from "Australia" and from Kaikoura, New Zealand.

These have been studied in conjunction with other Australian and New Zealand specimens in European museums, including Gould birds which are presumably cotypes, and the type of "*Diomedella cauta rohui*" Mathews, from Botany Bay, New South Wales.

All of the above are similar in appearance, with white heads and napes, matching in every respect Gould's original description. Color notes on the few labels that bear them state that the bills were gray, with the tip of the maxilla horn color, and the feet and legs gray or grayish. Measurements of nine specimens are summarized below, but, in view of the small number of birds and their miscellaneous nature, the figures can hardly be regarded as an adequate statistical record for the subspecies.

Wing, 552–579 (564.8); tail, 190–214 (203.6); culmen, 129–140 (134.1); width of maxilla at base, 31–35 (32.5); depth of closed bill at base, 51–59 (54.7); tarsus, 89–96 (92.4); middle toe with claw, 132–144 (137.2) mm.

***Thalassarche cauta salvini* (Rothschild)**

Thalassogeron salvini ROTHSCILD, 1893, Bull. Brit. Orn. Club, I, p. lviii (New Zealand).

Nestling young and breeding adults from Bounty Island and the waters roundabout, February 26, 27, 1926; one female, lat. 38° S., long. 179° W. (east of East Cape, New Zealand), December 2, 1925; one female, lat. 44° S., long. 173° W. (east of the Chatham Islands), January 29, 1926.

To these should be added two specimens collected during the Brewster-Sanford South American Expedition, namely, a female, 20 miles west of Cañete, Peru, June 26, 1913, and a female, off Valparaiso, Chile, March 4, 1914. In the British and Tring museums I have examined and measured many other New Zealand, Bounty Island, and Auckland Island specimens, including the type of the race and the bird figured as *salvini*, in Godman's 'Monograph of the Petrels.' Five additional South American examples in the same institutions deserve special citation: a male, near the Ballestas Islands, Pisco Bay, Peru, March 5, 1912; three males and a female, off Lobos de Tierra Island, northern Peru, May 28, June 20, 26, and 27, 1912. One of the last is a young male in the plumage that has been described as characteristic of *Thalassarche layardi*. I shall revert to this matter.

The characteristic features of *T. cauta salvini* are the gray head, combined with a gray bill similar to that of typical *cauta*. The hue of the head and nape in fresh plumage varies between pale neutral gray and deep gull gray, lighter on the crown and sometimes whitish on the throat. As wear progresses, all of these parts become lighter, because the bases of the feathers are white, but the head of *salvini* never has the sleek creamy white surface, with a pale gull gray tinge on the cheeks, which is characteristic of the typical race in high plumage.

Notations on the labels of our Bounty Island specimens, together with a water color drawing of a nesting adult by Mr. Correia, show that the bills were bluish or greenish gray, with a horny or "ivory" culmen, and a blackish terminal spot on the mandible. The transverse fleshy stripe at the base of the mandible was orange. The legs and feet are recorded as bluish or bluish gray. The same notes on flesh colors are found on the labels of our specimens from the west coast of South America, which, in appearance and dimensions are indistinguishable from topotypes.

The following summary of measurements is based upon typical adults from all of the localities named above.

Thirty-two males and females: wing, 523-585 (556); tail, 188-220 (205); exposed culmen, 117-135 (128); width of maxilla at base, 27-33 (30); depth of closed bill at base, 46-56 (51.6); tarsus, 80-95 (88.1); middle toe with claw, 121-139 (131.3) mm.

The range of bill size is notably smaller than in *T. cauta cauta*. Sexual dimorphism is almost negligible, as shown by the following comparison based upon 16 breeding adults of *T. cauta salvini* from Bounty Island and the neighboring waters.

	WING	TAIL	CULMEN	TARSUS	TOE
10 ♂	548-585 (562)	204-216 (210)	128-134 (131)	85-95 (90.1)	134-137 (135)
6 ♀	547-577 (560)	201-220 (210)	124-130 (128)	82-93 (87)	125-137 (130.8)

Well-grown chicks are represented among our Bounty Island birds. These were moulting from a light neutral gray down into a plumage exactly like that of their parents. Their bills were blackish in the younger stages, graying as they approached full size. The feet were light bluish, sometimes almost white.

As noted above, certain specimens of *T. cauta salvini* not only closely match the description of the *Thalassogeron layardi* of Salvin (1896, 'Cat. Birds Brit. Mus.,' XXV, p. 450, Cape of Good Hope seas), but also resemble the type skin of that form. This resemblance seems to be the result of fading, no less than wear, of the gray head-feathering. Salvin's measurements for *layardi* fall within the range of those of *salvini*. It would seem as though the former, if it really exists as a subspecies, had not yet been properly characterized. Neither would it be surprising if *T. cauta salvini* extends its range westward across the Indian Ocean as it does eastward across the Pacific. Possibly the type of *layardi* is merely a bleached specimen of *salvini*, the counterparts of which are not uncommon among pelagic wanderers taken in the Pacific. On the other hand, it is possible that a representative of the species *cauta* breeds in the vicinity of the Cape of Good Hope. In the Tring Museum there are two undated birds of unknown sex labeled, respectively, Robben Island and Dyer's Island, South Africa.

***Thalassarche cauta eremita*, new subspecies**

SUBSPECIFIC CHARACTERS.—Differs from *Thalassarche cauta salvini* in that the coloring of the head and nape is more uniform, and much darker (deep neutral gray to deep mouse gray instead of light neutral gray), the bill entirely yellow, the size slightly smaller, particularly in length of wing.

TYPE.—No. 211,438, Amer. Mus. Nat. Hist.; male adult, nesting; Pyramid Rock, off Pitt Island, Chatham Islands; March 2, 1926; R. H. Beck.

MEASUREMENTS.—(7 males, 9 females): wing, 534–562 (546); tail, 203–218 (209); exposed culmen, 117–130 (125.7); width of maxilla at base, 28–33 (30.1); depth of closed bill at base, 49–54 (51.4); tarsus, 82–90 (86.2); middle toe with claw, 122–137 (128) mm.

RANGE.—Known only from Pyramid Rock and the waters immediately adjacent.

Adults, mostly with enlarged gonads, from Pyramid Rock and vicinity, March 2 and 3, 1926.

The Pyramid, or Tarakoikoia Islet, is the southernmost of the Chathams. It is an islet 566 feet in altitude, lying about four and a half miles south-southeast of Pitt Island. Other islets in the Chatham group were found to be occupied by albatrosses of other species. So far as known, Pyramid Rock is the only breeding ground of *Thalassarche cauta eremita*. As related heretofore, examples of the species *cauta* collected on the high sea about the Chatham Islands belong to the other two subspecies, not to *eremita*. The series from Pyramid Rock is, however, entirely uniform.

In size the sexes are practically alike, males showing a very slight superiority, as in *T. cauta salvini*.

Flesh colors recorded on the labels give the bill merely as "yellow," the feet as "whitish" or "bluish-white." In the dried skins the bills are clear straw yellow, with a dark horny spot on the nail of the mandible. They are thus very different in appearance from the bills of the two races considered above. Fortunately, Mr. Correia's notes include a beautiful, life-size water color sketch of the head of a breeding female. Comparing this with the plates of Ridgway's 'Color Standards,' we may describe the bill of the living bird as follows: entire culmen, light cadmium; latericorn, deep chrome, slightly lighter basally; mandible, deep chrome, with the ramus lighter and the distal plate terminating in a dusky spot; transverse line at base of mandible, cadmium orange, a color continued along the gape of the mouth; narrow skin between plates of bill and feathering, and also that extending to the nostril between the culminicorn and the latericorn, black.

Aside from bill color, the dark gray head of *eremita*, with only slight variation on either forehead or throat, presents an aspect very unlike those of the subspecies *cauta* and *salvini*. The black loreal-ocular streak is inconspicuous in *eremita* because it divides regions of practically the same tone instead of separating gray lores from a whitish crown.

The fact that *eremita* is a short-winged race, apparently confined to a single small breeding area, and overlooked during so many decades of marine collecting, might lead to the interesting speculation that it is also

a highly sedentary subspecies, in sharp contrast with its closest relatives. It is equally possible, however, that the lack of previous recognition is due rather to its small numbers, which would proportionately reduce the chances of capturing specimens at a distance from the nesting area. So far as we know, the entire population of the race comprises only a few hundred birds. Perhaps the present diagnosis may lead to the recognition of other specimens in collections, which may have been identified as *salvini*, and thus extend our knowledge of an extraordinarily interesting discovery.

***Thalassarche bulleri* (Rothschild)**

Diomedea bulleri ROTHSCCHILD, 1893, Bull. Brit. Orn. Club, I, p. lviii (New Zealand).

Diomedea platei REICHENOW, 1898, Ornith. Monatsber., VI, p. 190 (Cavancha, Chile).

Diomedella cauta Platei, DABBENE, 1926, El Hornero, III, p. 324 (part).

Specimens from Forty-Fours Islets and Round Rock, Chatham Islands, and the adjacent waters, March 6, 8, and 16, 1926; one female, lat. 35° S., long. 175° W. (northeast of North Island, New Zealand), December 9, 1928.

In the Brewster-Sanford South American series are a male and a female taken twenty miles west of Cañete, Peru, June 26, 1913, and a male from Valparaiso, Chile, March 9, 1914. Many additional skins from the New Zealand region (Dunedin, Otago Head, Snares Island, etc.), including the type of the species, and also the type specimen of "*Diomedea platei*" from the coast of Chile, have been studied in the museums at London, Tring, Berlin, and Frankfurt.

Diomedea platei has hitherto been synonymized with *Thalassarche cauta*. It proves, however, to be a young example of *bulleri*, entirely comparable with specimens of like age in the American Museum. The bill of the type specimen shows all the peculiarities of the species. An obsolescent mandibular sulcus is well marked. The head is suffused with buffy gray, as in other juvenals, but the forehead is already whiter than the crown. The body plumage is quite fresh; I should judge that the bird had not been many weeks out of the nest.

The *Thalassogeron desolationis* of Salvadori (1911, Bull. Mus. Zoöl. Anat. Torino, XXVI, No. 638, p. 2), from the Pacific entrance of the Strait of Magellan, I am unable to identify from the published description. The recorded length of the culmen (114 mm.) seems too small for any form of *cauta*, while the dimensions of wing and tarsus are too great for *bulleri*.

Forty-Fours Islets, where the bulk of our series was collected, lie nearly on the parallel of 44° S., about twenty-two miles from the south-east point of Chatham Island. Round Rock is off the south point of Pitt Island.

Most of the Chatham Island birds were undergoing moult and replacement of the quills. Descriptions of the flesh colors are again supplemented by paintings of freshly killed specimens from the brush of Mr. Correia. Bill, black on the latericorn and upper half of mandible; culminicorn, nail, and ramal portion of the mandible, bright yellow; transverse stripe at base of mandible, orange. Feet and legs, light blue, richest among breeding birds. Although the feet were always bluish in life, their dark color in the dried skins explains why Godman records them as red.

Males average very slightly, if at all, larger than females. The following summary of dimensions is based upon twenty-nine specimens from all of the localities named above, and almost equally divided as to sex.

Wing, 462-526 (500); tail, 175-199 (188.6); exposed culmen, 115-126 (120); width of maxilla at base, 26-30; depth of closed bill at base, 42.5-49; tarsus, 78-85 (81.1); middle toe with claw, 110-124 (117.2) mm.

Mr. Beck records that a male from Forty-Fours Islet weighed eight pounds in the flesh, and had a wing-spread of six feet ten inches.

In my opinion, it is impracticable to attempt generic subdivision among the smaller albatrosses of the group to which both *bulleri* and *cauta* belong. There is wide latitude in the precise arrangements of the plates of the bill, even among individuals of the same species. In general, the dorsal aspect of the bill of *bulleri* resembles that of *melanophris*. The culminicorn and latericorn are practically in contact behind the nostril, and the basal width of the latericorn does not exceed 20 mm.

In *cauta* the membrane between culminicorn and latericorn varies in distinctness, but there is always such a membranous space between the base of the culmen and the feathering of the forehead. The width of the latericorn at its base, exceeding 25 mm., will serve to distinguish the species from *bulleri* or *chrysostoma*.

PROCELLARIIDÆ

Puffinus griseus (Gmelin)

Procellaria grisea GMELIN, 1789, 'Syst. Nat.,' I, part 2, p. 564 ("Southern Hemisphere, from latitudes 35°-50°" = New Zealand seas).

Nectris chilensis BONAPARTE, 1856, 'Consp. Av.,' II, p. 202.

Puffinus Stricklandi RIDGWAY, 1884, in Baird, Brewer, and Ridgway's, 'Water Birds North America,' II, p. 390.

Puffinus griseus, LOOMIS, 1918, Proc. Calif. Acad. Sci., (4) II, part 2, No. 12, p. 132

Puffinus griseus chilensis, DABBENE, 1923, El Hornero, III, p. 9, Fig. on p. 25.

Specimens from Mokohinou Islets, east coast of North Island, New Zealand, January 13, 1926 (nesting adults); adults and half-grown downy young, Rabbit Islet, Chatham Islands, March 6, 1926; numerous adults taken at sea between New Zealand, the Chathams, and Bounty Island, (lat. 37°–50° S., long. 175° E.–173° W.), November 30, 1925 to March 2, 1926.

The chicks referred to are covered with deep Quaker drab down, much longer and of looser texture on the dorsal surface than below.

In addition to the Whitney Expedition specimens, the American Museum possesses other New Zealand examples, as well as one labeled "Samoa, 1911." The latter formed part of a considerable collection of Samoan birds presented by the Hon. Mason Mitchell. In general, however, this shearwater seems to avoid the central parts of the Pacific and Atlantic Oceans, and to confine its range rather to the peripheries.

In fixing the type locality of *P. griseus* in the New Zealand region, I follow Mathews (1912, 'Birds Austral.,' II, p. 95), who states that the type specimen of Latham's description, upon which Gmelin based his name, came from 40° S., in the Pacific Ocean, near New Zealand.

Although seven or more specific names have been applied to this shearwater, it seems clear that all Pacific and Atlantic specimens are indistinguishable from the New Zealand form. The American Museum has large series from both oceans in both the northern and the southern hemispheres. I have compared these, and have also prepared tables of measurements based upon birds from each comprehensive locality. The figures agree well with those of Loomis (1918, p. 137), which cover 165 specimens from the coast of California. In other words, the world-wide individual variation proves to be approximately the same as the individual variation of a fully representative series from a single locality.

The figures given below include measurements of both sexes, and are drawn from the New Zealand birds already listed, and from other American Museum specimens bearing the following data:

PACIFIC COAST OF AMERICA.—Queen Charlotte Islands, June, August; Washington, June, August; California (many localities), May to November; Lower California, including the Gulf, July; west coast of Mexico, September; Panama, June; Ecuador, July; Peru (many localities), April to June, November; Chile (many localities), January to March, September, December (nesting at Wollaston Island, January, 1915).

ATLANTIC COAST OF AMERICA.—Patagonia (48°–57° S. lat.), September; northern Argentina, October; east coast of Florida, June; Gulf coast of Florida, July; Cape Hatteras, June; Long Island, N. Y., June; Massachusetts, May, August; Nova Scotia, June; Labrador, August; Grand Banks, August.

Forty males and females: wing, 280–309 (293); tail, 84–99.2 (89.4); exposed culmen, 38–45.6 (41.7); tarsus, 52.5–59.5 (55.4); middle toe with claw, 50.9–71.5 (63.1) mm.

These figures should be compared with those of Loomis, who has segregated the males and females. The sexes appear to be alike in size, and Loomis's own data do not warrant his statement that the majority of females are smaller than males.

Flesh colors, according to the labels of New Zealand and South American specimens are: bill, blackish, but sometimes horn-color on the mandible; legs and feet externally blackish, but blue or purplish on the webs, inner toes, and inner side of tarsus.

***Puffinus tenuirostris* (Temminck)**

Procellaria tenuirostris TEMMINCK, "1838," (= 1835), 'Nouv. Recueil de Planches Color. d'Ois.,' V. livraison 99, text facing Pl. 587 (seas north of Japan, and the coast of Korea).

Puffinus tenuirostris tenuirostris HARTERT, 1920, 'Vög. Paläarkt. Fauna,' II, p. 1427.

Two males, lat. 37°–38° S., long. 179° W., December 1, 1925.

The locality is east of North Island, New Zealand. One specimen had just completed the moult of the wing quills, and the very short new remiges are enclosed in the sheaths. The wing length of this example is only 256 mm.

The two Whitney Expedition specimens represent different plumage phases, one having a whitish throat and wing lining, the other being dark. The bills of both were "blackish," the legs and feet "purplish," with the outer toe and outer side of tarsus black. The testes of both were small.

There is nothing in appearance or dimensions to distinguish them from other examples of the species taken at widely separated points in the Pacific. The measurements below are based upon eight specimens in the American Museum collection, the wing length of the moulting Whitney Expedition bird being omitted. Additional localities represented are as follows: Anadyr, northeastern Siberia; seventy-five miles west of St. Paul Island, Alaska; Akutan Island, Alaska; Tuamotu Archipelago, South Pacific; "Philip Island, New Zealand." The last may refer to the Philip Islet at Norfolk Island or to Phillip Island, Victoria, Australia, a known breeding ground.

Eight specimens, 6 of which are males: wing, 263–277 (272); tail, 76.9–85.8 (80.9); exposed culmen, 32.2–34 (33); tarsus, 49.4–52.9 (50.9); middle toe with claw, 57.5–62.2 (59.6) mm.

The figures agree well with those presented by Loomis (1918, p. 140) and by Hartert. In view of Loomis's study of fifty-five specimens taken off Point Pinos, California, it would seem that dichromatic variation and intermediate plumage stages are sufficient to include all the described races of this species. So far as I know, the bird has not been found nesting in the northern hemisphere. The alleged subspecies, *brevicaudus*, apparently needs further support than has yet been advanced.

Both the form and the shortness of the bill are apparently sufficient to distinguish *Puffinus tenuirostris* with certainty from *P. griseus*.

***Puffinus carneipes* Gould**

Puffinus carneipes GOULD, 1844, Ann. and Mag. Nat. Hist., p. 365 (small islands off Cape Leeuwin, western Australia).

Specimens from the Gulf of Hauraki, Mokohinou Islets, Hen and Chickens (Moro Tiri) Islets, New Zealand, January 12–14, 1926; at sea, east of North Island, New Zealand (lat. 35°–38° S., long 170°–180° W.), November 30–December 10, 1925; east of the Chatham Islands (lat. 42°–44° S., long. 173°–175° W.), January 25–29, 1926; also two older specimens, one a fledgling with down still clinging to its plumage, from Lord Howe Island.

The birds collected at sea during November and December, 1925, were mostly in breeding condition. The other Whitney Expedition specimens had small gonads.

The Lord Howe Island specimens are comparable in every way with those in the New Zealand series. The same is true of California birds, as indicated by Loomis's figures (1918, p. 132). The several subspecific names used by Mathews and Iredale (1921, 'Man. Birds Austral.,' I, p. 29) have apparently never been correlated with actual conditions in nature.

The first example of *Puffinus carneipes* to be recorded from the eastern South Pacific is a male collected by R. H. Beck eight miles off Masatierra Island, Juan Fernandez, Chile, February 9, 1914, during the course of the Brewster-Sanford South American Expedition. This specimen is an adult with worn body plumage but recently renewed wing and tail quills. The testes were small, and the claws elongated and sharply pointed as is usual in petrels that have been long away from

their nesting grounds. It matches New Zealand specimens in both appearance and proportions, except for the long claws. Its measurements are as follows: wing, 324; tail, 108.7; exposed culmen, 43.8; tarsus, 55.5; middle toe with claw, 70 mm.

Below are the summarized measurements of twelve specimens from the New Zealand region, including Lord Howe Island. They may be compared with Loomis's table, for I have found by tests upon identical specimens that the late Mr. Loomis and I arrive at approximately the same result with our respective calipers. In fact, the only noticeable difference in our method appears in tables for length of tarsus, in which Loomis's figures are usually slightly smaller than my own.

Six males, 6 females: wing, 317-329 (321.2); tail, 109-115.1 (113.2); exposed culmen, 37.6-43.3 (41); tarsus, 51.6-56.3 (54.2); middle toe with claw, 62.7-67 (65) mm.

The sexes are alike in size. Bill, flesh color, with the tip and the anterior part of the culmen black; feet and legs, flesh color, the tarsus and outer toe externally brown.

***Puffinus leucomelas* (Temminck)**

Procellaria leucomelas TEMMINCK, "1838," (= 1835), 'Nouv. Recueil de Planches Color. d'Ois.,' V, livraison 99, Pl. 587 and text referring thereto (seas of Japan).

One male collected in lat. 3° 10' S., long, 155° E. (near the Abgaris Islands, Bismarck Archipelago), January 4, 1928.

The specimen is marked as an immature bird, though it had attained full growth. Bill, "light gray and bluish horn color"; feet and legs, pale pinkish, with the outer toe and outer side of tarsus brownish. It agrees in every respect with specimens examined in the Berlin and Frankfort museums.

The following measurements include the Whitney Expedition bird and seven others labeled, respectively, "Japan," Sagami Sea, Uraga Channel, "New Guinea" (3), and Menado, Celebes Islands:

Wing, 300-326 (315); tail, 130-140.5 (135.2); exposed culmen, 48-52.5 (50.4); tarsus, 48-52 (49.8); middle toe with claw, 59-67 (63.2) mm.

P. leucomelas is the type of the subgenus *Calonectris*, the reputed characters of which are somewhat vulnerable. However, it seems to be a member of a small but natural, and nearly cosmopolitan, group of shearwaters, which includes *P. creatopus* and *P. diomedea (kuhlii)*. Aside from its distinctive plumage, especially the streaked head, *P. leucomelas* differs from the other members in its relatively elongate bill and tail as compared with the lengths of tarsus and wing. In *P. crea-*

topus the bill is decidedly shorter than the tarsus; among all subspecies of *P. diomedea* the difference is less, though still in favor of the tarsus; in *P. leucomelas* these structures are subequal, the average length of the tarsus being slightly less than that of the culmen.

The two Pacific species, *P. leucomelas* and *P. creatopus*, show no evidence of sexual dimorphism. In *P. diomedea*, on the other hand, judging by measurements of good series of Atlantic and Mediterranean races (*diomedea*, *borealis*, and *edwardsi*), males average considerably larger than females.

***Puffinus gavia* (Forster)**

Procellaria gavia FORSTER, 1844, 'Descr. Anim.,' edit. Lichtenstein, p. 148 (Queen Charlotte's Sound, Cook Strait, New Zealand).

Specimens from New Zealand and the adjacent waters. Adults and downy young, Channel and Great Barrier Islands, January 18, April 21-23; adults, Gulf of Hauraki, January 12; Hen and Chickens Islets, January 14; off Lyttleton, January 28, 1926; lat. 38° S., long. 178°-179° W., December 4, 1925; lat. 44° S., long. 173° W. (east of the Chatham Islands), January 26, 29, 1926.

The chicks referred to are well grown, some completely covered with gray down, others with the contour plumage of dorsal surface, throat, and breast, exposed. Many of the adults taken at sea during December and January had enlarged gonads. Bill, blackish; feet and legs, flesh color, with the outer side of the toe and tarsus blackish.

The specimens exhibit a wide range of variation in the pigmentation of the ventral surface. A few are almost entirely white, whereas others have dark areas that extend as a heavy flecking across the base of the neck, and forward well toward the chin.

Great extremes in the degree of wear are also shown by birds collected during the same month; thus, a female taken east of the Chathams on January 29 is in fresh and glossy plumage, while another taken at Channel Island on January 18 is excessively worn and frayed both as to quills and body plumage.

The sexes are alike in size. Measurements from the series give the following figures:

Ten males, 5 females: wing, 206-224 (213.6); tail, 57.7-68.1 (62); exposed culmen, 34.2-37.4 (35.4); tarsus, 40.3-46.4 (43.2); middle toe with claw, 45-50.1 (47.6) mm.

Puffinus opisthomelas Coues, of the California coast, is clearly an eastern Pacific and northern hemisphere representative of *P. gavia*.

Although *opisthomelas* is of larger size, the proportions of the two species are identical. Moreover, they reveal a dual coloration of the same type (cf. Loomis, 1918, pp. 114-119, Pl. xiv). The under tail coverts of *gavia* appear to be uniformly white; those of *opisthomelas* are usually dark. However, Loomis reports that in some instances "white nearly supplants the dark color on the shorter lower tail-coverts." If there should prove to be an actual intergradation in this character, I should suppose that *opisthomelas* would have to be regarded as a subspecies of *gavia*.

Measurements of fifteen specimens of *P. opisthomelas* from the coasts of California and Lower California are as follows:

Wing, 233-245 (240); tail, 70.6-81.8 (76.1); exposed culmen, 35.4-38.5 (37.3); tarsus, 44.1-48.3 (46.2); middle toe with claw, 50-54.4 (52.4) mm.

***Puffinus heinrothi* Reichenow**

Puffinus sp.? HEINROTH, 1902, Journ. für Ornith., p. 397.

Puffinus heinrothi REICHENOW, 1919, Journ. für Ornith., p. 225 (Blanche Bay, New Britain).

From the Territory of New Guinea Museum Mr. Beck obtained a specimen of this interesting shearwater in exchange for other material. The American Museum also possesses two others, received through the courtesy of the Zoölogical Museum of Berlin, in which institution I have, moreover, examined the type. The few known examples all came from the northeasterly tip of New Britain. Our three are labeled Uatom Island, which lies just westward of the port of Rabaul. One of them appears to be a fledgling, and it is doubtful whether a second is fully adult.

Save for a whitish median area on the belly, and an admixture of white in the wing lining and on the chin and throat, this is an all sooty bird. The general color tone is brown and warm, not blackish or "bluish" as in the races of *Puffinus assimilis*. It is a very distinct species from any other known petrel, its most marked character, perhaps, being the exceedingly long and slender bill. In the following measurements of four specimens of unknown sex, the short wing and tail lengths of one fledgling are not included:

Wing, 185-198 (190.7); tail, 75.3-84 (79.5); exposed culmen, 29.8-32.3 (30.9); least depth of closed bill, 4.7-4.8; tarsus, 35-39.5 (36.4); middle toe with claw, 37.9-44.7 (41.3) mm.

The proportions and plumage characters indicate that *Puffinus heinrothi* may have its closest affinities with the *lherminieri* group (cf.

Murphy, 1927, Amer. Mus. Novit., No. 276, table on p. 15). It is clearly not related to *P. tenuirostris* or *P. nativitatis*, as suggested by Dr. Reichenow.

***Thyellodroma bulleri* (Salvin)**

Puffinus bulleri SALVIN, 1888, Ibis, p. 354 (New Zealand).

Specimens from Poor Knights Islets, North Island, New Zealand, January 16, 1926 (nesting); Gulf of Hauraki and Mokohinou Islets, January 12, 13, 1926; at sea, east of New Zealand and near the Chatham Islands (lat. 35°–44° S., long. 173°–180° W.), November 30–December 10, 1925.

Our excellent series from New Zealand has been compared with California specimens, and with others obtained off Valparaiso, Chile, between February 24 and March 13, 1914. I have also measured a Chilean series in the Berlin Museum. All these birds represent one form, as Loomis and others have already concluded. The following measurements agree substantially with those of Loomis (1918, p. 150), the only noteworthy difference being in the range of length of tarsus:

Twenty-four males and females from New Zealand, Chile, and California: wing, 275–300 (287.3); tail, 114–131.8 (125.3); exposed culmen, 39–44.6 (41.8); tarsus, 49–53.5 (51.5); middle toe with claw, 58.5–65 (61.5) mm.

Most of the South American examples taken during February and March were moulting their quills and had resting gonads. The New Zealand birds, on the other hand, were all believed by the collector, Mr. Beck, to be in the midst of their breeding period, and several were actually taken on their eggs during January.

Bill, blue or bluish, the tip and culmen, black; feet and legs inwardly flesh color, including the two inner toes and the webs; outer toe and outer side of tarsus, blackish. The blue of the bill may represent a heightening of color characteristic of the breeding season, for many non-breeding specimens are marked as having "grayish" beaks.

***Pterodroma leucoptera longirostris* (Stejneger)**

Æstelata longirostris STEJNEGER, 1893, Proc. U. S. Nat. Mus., XVI, p. 618 (Hondo, Japan).

"*Æstelata longirostris*," MURPHY, 1929, Amer. Mus. Novit., No. 370, p. 15.

Pterodroma longirostris, HARTERT, 1920, 'Vög. Paläarkt. Fauna,' II, p. 1431.

Six specimens referable to this form were taken during the Crane Pacific Expedition on August 17, 1929, in lat. 39° 22' N., long. 148° 46' E., North Pacific Ocean. The locality is about six hundred miles

east of the northern end of Honshu, Japan. Five of the skins have been kindly lent by the authorities of the Field Museum of Natural History, Chicago, and have been compared with the other races of *Pterodroma leucoptera* considered in my recent review of the group.

Stejneger's notes on the characteristics of this form are not all diagnostic because the subspecies of both *Pterodroma leucoptera* and *Pterodroma cookii* have proved more complex than was realized in 1893. However, *longirostris* differs in appearance from typical *leucoptera* and from *masafueræ* in that the gray or blackish patch at the sides of the breast is much reduced in extent. The inner webs of the tail quills, moreover, are prevailing darker in *longirostris* than in the forms named. From *Pterodroma leucoptera hypoleuca*, which *longirostris* generally resembles, it differs in that the primaries are largely white on their inner vanes. The last is an excellent and constant character; the two races *hypoleuca* and *brevipes* have solidly dark wing quills, while all other subspecies of *leucoptera* show the white wedges.

Dimensions of the Crane Expedition specimens, of which two were males and three females, agree closely with Stejneger's measurements of the two previously known examples. All five of the new birds, as well as the type and cotype, were moulting the quills when captured, the outer primaries of the Crane skins still bearing the sheaths. The range of wing and tail lengths may, therefore, be abnormally low.

Five specimens (2 males, 3 females): wing, 201-210 (203.8); tail, 90.5-101.6 (96.5); exposed culmen, 23.6-25.4 (24.7); tarsus, 27.7-31.4 (28.9); middle toe with claw, 32.2-37.6 (36.3) mm.

